

REMARKS

Applicant intends this response to be a complete response to the Examiner's **28 December 2009** Non-Final Office Action. Applicant has labeled the paragraphs in his response to correspond to the paragraph labeling in the Office Action for the convenience of the Examiner.

DETAILED ACTION

Preliminary Statement

Summary of Claims Status

Applicants had previously canceled claims 7, 27, 41 and 43.

Applicants previously added claims 45-57.

Applicants have currently withdrawn claims 1-6, 8-26, 28-40, 42 and 44 as drawn to non-elected subject matter.

Applicants have currently canceled claims 45-47 and 57.

Applicants have added new claims 58-80.

Applicant believe that no additional claim charges are due as application originally paid for 44 claims, including 5 independent claims. As presenting amended, the application include 3 independent claims as 33 claim in total, which Applicants believes is within the confines of the previously paid claims.

Drawings

The Examiner states and contends as follows:

1. The corrected drawings received April 13, 2009 are approved by the examiner.

Applicants acknowledge the Examiner's statements.

Election of species Election

The Examiner states and contends as follows:

2. This examiner notes that in response to the election of species of **August 24, 2009** at applicant has elected species E (i.e. claims 41, 43, and 44) whoever the examiner notes at applicant has also **canceled claim 41** and **canceled claim 43** and withdrawn claim 44 based on the plain delineator present in the action for those claims. The applicant has added new claims 45-47 which applicant now believes corresponds to species E.

Applicants acknowledge and appreciate the Examiner's statements and will attempt to stay within the parameters of the election.

Claim Objections

3. **Claim(s) 49, 51, and 53** stand objected to because of the following informalities: **A)** improper claim dependency.

The Examiner states and contends as follows:

Claim(s) 49,51, and 53 improperly depend from claim 46, when they actually should be depending from claim 47, since claim 47 sets forth the features on which **claims 49, 51, and 53** rely

Correction of the dependency problem is requested. Appropriate correction is required.

Applicants have amended claims 49, 51 and 53 to correct the dependency problem. In fact, Applicants have canceled claim 445-47 and combined them into new dependent claim 58 and the dependencies of claims 49, 51 and 53 is now upon claim 58. Applicants, therefore, respectfully request withdrawal of these objections.

The Examiner states and contends as follows:

4. **Claim 56** is objected to because applicant fails to specify that the apertures in **claim 56** are (**single-sided 1 non-collinear**) [i.e. distinct from the situation of a closed magnetic resonance system with a tunnel that extends from one side of the apparatus of the other, the openings on either end broadly being interpreted as separate apertures]. See the Examiner's comment on a potential novel recitation of claim 56 below.

Applicants thank the Examiner for the kind suggestion. Applicants have added new independent claim 59 incorporating the suggestion and the limitations of claim 45. Applicants, therefore, respectfully request withdrawal of these objections.

The Examiner states and contends as follows:

5. **Withdrawn Claim 44** which was amended by applicant with this last response to now depend from newly added claim 45 has an improper claim dependency, since it appears to rely on a rectangular form, provided by the closed saddle coils of claim 46? (I.e., if the closed saddle coils are intrinsically considered to have a rectangular form).

Applicants have corrected the dependency of claim 44 to correctly depend from claim 42 and not 45. Applicants' attorney apologizes for the mistake in the dependency, Applicants, therefore, respectfully request withdrawal of these objections.

Claim Rejections - 35 USC § 102

7. **Claims 45-46** stand rejected under 35 U.S.C. 102(b) as being anticipated by Heid et al., US patent application publication 200410239327 published December 2, 2004, filed March 25, 2004.

The Examiner states and contends as follows:

8. With respect to Claim 45, Heid et al., teaches and shows "A small animal MRI apparatus" "a small animal MRI apparatus" is broadly interpreted as an MRI apparatus capable of imaging any small sized member of the "animal kingdom." of classification, this includes potentially small human children or human infants, cats, dogs, birds, mice, rats etc..) "comprising: a vacuum housing including at least one cylindrical aperture, where each aperture is configured to receive a small animal" [See component 312[figures 1-6, paragraph [0031] and [0032]], "a coolant assembly including a coolant inlet, a coolant outlet and a cold plate, where a coolant is adapted to cool the cold plate," [Paragraph [0027] "at least one resonator comprising: a plurality of closed saddleshaped coils in thermal contact with the cold plate" [See paragraph [0027], "where the coils are arranged to form a cylindrical structure so that a resonator surrounds each aperture to permit MRI imaging of an animal placed in each of the apertures". [See component 31 2[, figures 1-6, paragraph [0031] and [0032]].

9. With respect to Claim 46, Heid et al., teaches and shows wherein the resonator comprises: two closed saddle-shaped coils. [See resonating gradient coil structures 120, 121, 122, I231 The same reasons for rejection, , that apply to claim45 also apply to claim 46 and need not be reiterated.

Applicants have canceled claims 45 and 46, rendering the present rejection moot. Applicants are not capitulating the validity of the rejection, but have added new independent claims 58 incorporating limitations that the Examiner suggest would be potentially patentable. Applicants

expressly reserve the right to file continuation/divisional applications to seek protection of the rejected and non-elected subject matter. Applicants, therefore, respectfully request withdrawal of these rejections.

Claim Rejections - 35 USC § 103

13. **Claim 54 and 55** stand rejected under 35 U.S.C. 103(a) as being unpatentable over Heid et al., US patent application publication 200410239327 published December 2, 2004, filed March 25, 2004, as applied to Claims 45,46 above in further view of Doty US patent 6,087,832 issued July 11, 2000.

The Examiner states and contends as follows:

14. With respect to Claim 45, Heid et al., teaches and shows "A small animal MRI apparatus" "a small animal MRI apparatus" is broadly interpreted as an MRI apparatus capable of imaging any small sized member of the "animal kingdom" of classification, this includes potentially small human children or human infants, cats, dogs, birds, mice, rats etc.,)" comprising: a vacuum housing including at least one cylindrical aperture, where each aperture is configured to receive a small animal" [See component 312[, figures 1-6, paragraph [0031] and [0032]], "a coolant assembly including a coolant inlet, a coolant outlet and a cold plate, where a coolant is adapted to cool the cold plate," [Paragraph [0027] "at least one resonator comprising: a plurality of closed saddleshaped coils in thermal contact with the cold plate" [See paragraph [0027], "where the coils are arranged to form a cylindrical structure so that a resonator surrounds each aperture to permit MRI imaging of an animal placed in each of the apertures" . [See component 31 2[, figures 1-6, paragraph [0031] and [0032]].

15. With respect to Claim 45, Heid et al., teaches and shows wherein the resonator comprises: two closed saddle-shaped coils. [See resonating gradient coil structures 120, 121, 122, 1231 The same reasons for rejection, , that apply to claim45 also apply to claim 46 and need not be reiterated.

16. With respect to Claim 54, Heid et al.,, lacks directly teaching limitations that "each coil apparatus includes: a metal layer formed on an exposed portion of a dielectric layer or an external dielectric layer formed on an exposed portion of a superconducting layer with a metal layer formed on the outer surface of the external dielectric layer, where the metal layer forms a coupling or decoupling capacitive element with a corresponding portion of the superconducting layer" However, this feature is taught, specifically throughout the Doty patent. [See specifically column 3 line 29 through column 4line 43; with figures 1-4 but the entire teachings of Doty are also relevant with respect to this limitation See col. 1 line 11 through column 6 line 671. Doty also specifically teaches using his coils in combination with an MRI superconducting system. [Col. 4 line 56 through column 5 line 5 specifically see column for line 64.1 Therefore It would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of Heid et al.,, with the teaching of Doty because, Doty originated this limitation, and the context of Hid et al.,, does not specify the specifics dialectic specifics because in 2004 the ability to construct a solenoid coil as set forth in this limitation were known. The same reasons for rejection, obviousness, and motivation to combine, that apply to claim ## also apply to claim ## and need not be reiterated.

17. With respect to Claim 54, Heid et al.,, lacks directly teaching that "each coil apparatus further includes: a wire bonded to the metal layer, where the wire is adapted to link a plurality of the apparatuses together to form an array *or* to connect the apparatus to a pre-amplifier." However, this feature is also taught, specifically throughout the Doty patent. [See Doty specifically column 3 line 29 through column 4line 43; with figures 1-4 but the entire teachings of **Doty** are also relevant with respect to this limitation See col. 1 line 11 through column 6 line 671. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 45, 46, and 54** also apply to **claim 55** and need not be reiterated.

Applicants changed the dependency of claims 54 and 55; they now depend on what applicants believe are allowable independent claims 58 and 59, rendering the present rejection moot. Applicants are not capitulating the validity of the rejection, but have added new independent claims 58 incorporating limitations that the Examiner suggest would be potentially patentable. Applicants expressly reserve the right to file continuation/divisional applications to seek protection of the rejected and non-elected subject matter. Applicants, therefore, respectfully request withdrawal

of these rejections.

Potential Allowable Subject Matter

The Examiner states and contends as follows:

18. **Claims 56 and 47** are objected to as being dependent upon a rejected base claim, but would be **Potentially allowable** if rewritten in independent form including all of the limitations of the base claim and any intervening claims. See the examiner's comment on allowable subject matter below, since the main novelty of applicants claim is the combination of claim 45 and 56; properly put together.

19. The limitations of **claims 45,46, and 47 combinationally taken together are also potentially novel** since the earlier rejection of the limitation found within claim 47 by itself, , has already been historically rejected by the examiner in the course of this application's prosecution, [See the **Wong reference**, listed in the noted prior art of record below] However the combination with the additional structural components of 45 and 46 appears to make claim 47 potentially novel., based on an examiner's updated search, with the applicants next response.

20. **Claims 48-53 are also potentially allowable** because when corrected for proper dependency depend from **claim 47**.

21. **Claim 57 is also potentially allowable** because it depends from **claim 56**.

Applicants thank the Examiner for the thoroughness of the explanation of the allowable subject matter. Applicants have canceled claims 45-47 and introduced three new independent claims 58, 59 and 70. Independent claim 58 is directed to the potentially allowable subject matter set forth in paragraph 19, while claims 59 and 70 are directed to the potentially allowable subject matter set forth herein by the Examiner.

List of Potentially allowable claims:

The Examiner states and contends as follows:

Claim 56 --- The apparatus of **claim 45**, further comprising: a plurality of (**single-sided / non-collinear**) apertures, each configured to receive an animal so that a plurality of animals can be imaged simultaneously.

Claim 47 --- The apparatus of claim 46, wherein each saddle-shaped coil comprises:
four members, each member including a superconducting layer, where the members are arranged to form four overlapping regions, where **each overlapping region comprises a capacitor formed from overlapping portions of the superconducting layers of two of the members and an overlapping region dielectric layer** interposed therebetween, where two of the members are straight and two of the members are curvilinear to form the closed saddle-shaped coils. ----

Applicants thank the Examiner for the thoroughness of the explanation of the allowable subject matter. Applicants have canceled claims 45-47 and introduced three new independent claims 58, 59 and 70. Independent claim 58 is directed to the potentially allowable subject matter set forth in paragraph 19, while claims 59 and 70 are directed to the potentially allowable subject matter set forth herein by the Examiner.

Priority Resolution Pending?

The Examiner states and contends as follows:

22. The examiner has noted applicant's remarks in the response of August 24 2009; that applicants have filed a document with the United States PCT receiving office requesting a correction of the information associated with the case. The examiner has checked the online status of applicant's priority, but it is still showing inconsistent. The examiner is making an inquiry into this issue, applicant

should also follow-up, because the priority needs to be corrected.

23. While the examiner can still verify the validity of the provisional US application 601537,782, filed January 20, 2004, the applicant provided PCT application number for priority does not match The PCT application number submitted with the instant application. The PCT associated with US provisional application number 60/537,782 is still different than the serial number of the PCT provided by the applicant in the continuation data of the instant application.

24. Again, Applicant is required to take whatever steps are necessary in order to perfect the claim for priority. The online system so far does not indicate that the documents applicant claims to have filed have actually been received. Potential corrective actions may include any of the following: a new oath/declaration, a corrected filing receipt, an amended priority paragraph at the beginning of applicants' written description within the specification of the instant application, and/or Payment of all required fees.

25. The examiner is aware that the actual PCT application number associated with US provisional application number **60/537,782** is **PCT/US2005/001813** which is different than the PCT application number provided in applicant's original specification, oath declaration and Disclosure.

26. The examiner must reiterate, this priority concern, because there is still no corrected filing receipt currently present within applicant's electronic application at the USPTO. The examiner has also initiated an inquiry into this issue, on the PTO side, a follow-up by applicant may be needed.

Applicants are still attempting to correct this problem. Applicants have again contacted the PCT and believe that the problem may be in the process of being corrected. The PCT help desk has sent a message to the US Receiving Office documenting the problem, forwarding my request for correction of filing receipt and requesting that the USRO act and change the PCT application upon which this application claims priority. Applicants' attorney hopes that the error will be corrected shortly.

Examiner's Comments on Potential Allowable Subject Matter

The Examiner states and contends as follows:

27. The examiner notes that applicant specification, appears to disclose a novel MRI configuration for conducting MRI on multiple animal subjects, simultaneously, however applicants remaining non-withdrawn pending claims, do not set forth this novelty. Newly added claims 45, is to broadly written for the following reasons:

A) "a small animal MRI apparatus" is broadly interpreted by the examiner as an MRI apparatus capable of imaging any small sized member of the "animal kingdom" of classification, this includes potentially small human children or human infants, cats, dogs, birds, mice, rats etc..)

B) "a vacuum housing" (i.e. these are found in essentially all superconductive MRI magnet systems) "including at least one cylindrical aperture" (i.e. all conventional closed superconductive MRI systems have at least one aperture, which is at least partially cylindrical) as for the "where the aperture is configured to receive a small animal" (i.e. conventionally the aperture will be big enough to admit whatever type of subject of devices designed for, so the generic MRI closes the opening, which is capable of imaging potentially small human children or human infants, cats, dogs, birds, mice, rats etc., still meet this limitation)

C) "a coolant assembly including a coolant inlet, a coolant outlet, and a cold plate, where the cold plate, is adapted to cool the cold plate" (The examiner notes that closed superconductive MRI systems, intrinsically contain cryogenic components which must remain cold, and liquid hydrogen or nitrogen or helium is conventionally circulated, in a superconductive system via an inlet and outlet, to keep the bore of the magnet and/or the radiofrequency coils and/or the gradient coils cool. These components are conventionally part of the generic cryostat of a superconductive closed MRI system.

D) "at least one resonator comprising" The examiner notes that the claim term "resonator" reads on anything which is capable of resonating, which includes both Radiofrequency and gradient coils which are conventional components of a closed superconductive MRI system.

E) in a situation where there is only one aperture, or a single tunnel through which the patient is carried, when the aperture extends the entire length of the closed MRI conventional system, the subject undergoing imaging being placed

within the aperture, is conventional MRI procedure, and not a novel and nonobvious feature of the applicants invention. Additionally the above applied prior art of **Heid et al.**, teaches using "a plurality of closed saddle shaped coils", which are built into the walls of the upper and lower cylindrical portions of the **Heid et al.**, invention, which directly suggests that there is "a resonator" surrounding the aperture, which the subject is placed for imaging. Additionally the plurality of saddle shaped coils based on the teachings provided in the **Heid et al.**, reference are in thermal contact with the (not shown) cooling system, which the examiner considers to be the conventional cryostat system which implies that the cold plate remains cold, while at inlet and outlet allow the cryogenic components such as liquid hydrogen or liquid nitrogen, to circulate and maintain the magnet at superconductive operational ability.

F) "the coils" in the applied prior art reference "are arranged to form a cylindrical structure so that a resonator surrounds the aperture in order to permit MRI imaging of an animal. (i.e. a human) placed in the aperture of the imaging device. This is a recitation of applicants' claim 45 when there is only a single aperture present. Therefore, the examiner is unable to determine a point of novelty within applicants newly filed independent claim 45, as set forth by applicant.

G) From the specification of applicant's disclosure, it is clear that, the taught novelty of applicant's invention is **the ability to image multiple small non-human subjects simultaneously, with an MRI system containing multiple one-sided or noncollinear apertures, or cavities which do not extend all the way through the MRI system.** (A closed MRI system with a single tunnel that extends from one side to the other has potentially two different apertures, in a situation where two subjects could potentially be brought in together from either end of the MRI apparatus, although causing the subjects to collide with one another would be highly undesirable.)

Applicants thank the Examiner for the thoroughness of the explanation of the allowable subject matter. Applicants have canceled claims 45-47 and introduced three new independent claims 58, 59 and 70. Independent claim 58 is directed to the potentially allowable subject matter set forth in paragraph 19, while claims 59 and 70 are directed to the potentially allowable subject matter set forth herein by the Examiner.

Potential Correction to Set Forth Applicant's Novelty

The Examiner states and contends as follows:

Possible Claim corrections

28. Claim 45 ---A MRI apparatus capable of imaging a plurality of small nonhuman (i.e. unless applicant is intending on human imaging being applicable) animals, simultaneously, comprising:

a plurality/multiple of, (i.e. at least two) **one-sided or non-collinear apertures**, (i.e. openings which do not extend all the way through the MRI system, or do not occur in the same plane along the same line)

a vacuum housing including at least **two** cylindrical **one-sided or non-collinear** apertures, where each aperture is configured to receive a small **nonhuman** animal;

a coolant assembly including a coolant inlet, a coolant outlet and a cold plate, where a coolant is adapted to cool the cold plate,

at least **two** (superconductive?) resonators, each resonator comprising:
a plurality of (superconductive?) closed saddle-shaped coils in thermal contact with the cold plate,

where the plurality of closed saddle-shaped coils are arranged **in order** to form a (superconductive?) cylindrical resonating structure so that a separate resonator surrounds each **one-sided or non-collinear** aperture **in order** to permit **simultaneous** MRI imaging of a small non-human animal placed in each of the plurality/multiple (i.e. at least two) **one-sided or non-collinear** apertures.

29. The examiner notes that applicant's independent claim should make clear that, the physical MRI apparatus itself has more than one single sided, or non-collinear aperture present, because the situation of having a tunnel with the first end in a second end meeting the aperture limitation is the situation that must be avoided.

30. Additionally, the claim must be clear that, the MRI apparatus is capable of imaging at least two different non-human animal subjects, simultaneously, when each aperture contains an examination subject.

31. The examiner notes that it is possible to have an MRI device, which has multiple apertures, where imaging is only being performed on one subject in one single aperture, but one subject, enclosed in one single resonating aperture, is the conventional way in which MRI is performed, and is not a novel component by itself, since the novelty is dependent on their being at least **two cylindrical one-sided or non-collinear** apertures present within the device. The ability to perform, what would normally be conventional MRI with the novel of the aperture simultaneously MRI imaging apparatus might however be a potential dependent claim. Additionally, if applicant intends the resonator to be superconductive, and the fact that the resonator is superconductive should be stated in the claim, which also gives support to the plurality of saddle coils being superconductive in the subsequent dependent claims.

Applicants thank the Examiner for the thoroughness of the explanation of the allowable subject matter. Applicants have canceled claims 45-47 and introduced three new independent claims 58, 59 and 70. Independent claim 58 is directed to the potentially allowable subject matter set forth in paragraph 19, while claims 59 and 70 are directed to the potentially allowable subject matter set forth herein by the Examiner. Applicants have attempted to use the proposed independent claims above to fashion the new independent claims. Applicants intended the new proposed independent claims to track the Examiner's kind suggestions.

Prior Art of Record

The Examiner states and contends as follows:

32. The prior art made of record from the November 12, 2008 office action is still considered pertinent to applicant's disclosure. However due to the numerous amendments, which resulted in each of the independent claims, corresponding to a separate species, and necessitating the election of species herein. The examiner will continue with the examination on them merits process, once applicant has responded with the species election

A) **Wong et al., US patent 6,377,047 B1 issued April 23, 2002, filed June 8, 2000.**

Applicants acknowledge the Examiner's statements.

Summary Statement

If the Examiner deems that claims 48-56 and 58-80 allowable, then Applicants expressly authorize the Examiner, by process of Examiner's amendment, to cancel non-elected claims 1-6, 8-26, 28-40, 42 and 44. Applicants expressly reserve the right to file one or more continuation or divisionals to address non-elected and rejected subject matter.

If it would be of assistance in resolving any issues in this application, the Examiner is kindly invited to contact applicant's attorney Robert W. Strozier at 713.977.7000

The Commissioner is authorized to charge or credit Deposit Account 501518 for any additional fees or overpayments.

Respectfully submitted,

Date: **29 March 2010**

/Robert W. Strozier/

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